



## Complete Summary

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### GUIDELINE TITLE

Haematuria.

### BIBLIOGRAPHIC SOURCE(S)

Finnish Medical Society Duodecim. Haematuria. In: EBM Guidelines. Evidence-Based Medicine [Internet]. Helsinki, Finland: Wiley Interscience. John Wiley & Sons; 2004 Aug 26 [Various].

### GUIDELINE STATUS

**Note:** This guideline has been updated. The National Guideline Clearinghouse (NGC) is working to update this summary.

## COMPLETE SUMMARY CONTENT

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## SCOPE

### DISEASE/CONDITION(S)

Haematuria

### GUIDELINE CATEGORY

Evaluation

### CLINICAL SPECIALTY

Family Practice  
Internal Medicine  
Pediatrics  
Urology

## **INTENDED USERS**

Health Care Providers  
Physicians

## **GUIDELINE OBJECTIVE(S)**

Evidence-Based Medicine Guidelines collect, summarize, and update the core clinical knowledge essential in general practice. The guidelines also describe the scientific evidence underlying the given recommendations.

## **TARGET POPULATION**

Patients with haematuria

## **INTERVENTIONS AND PRACTICES CONSIDERED**

### **Evaluation**

1. Medical history including use of medication
2. Clinical investigation including check for petechiae, bruising and lymph nodes, blood pressure, abdominal and prostate palpation, and laboratory tests
3. Urinalysis
4. Ultrasound examination of the kidneys and urinary tract
5. Cytology
6. Cystoscopy, if applicable
7. Other investigations for selected patients including computed tomography, urography, angiography, pyelography, renal biopsy

## **MAJOR OUTCOMES CONSIDERED**

Sensitivity and reliability of diagnostic tests

## **METHODOLOGY**

### **METHODS USED TO COLLECT/SELECT EVIDENCE**

Hand-searches of Published Literature (Primary Sources)  
Hand-searches of Published Literature (Secondary Sources)  
Searches of Electronic Databases

### **DESCRIPTION OF METHODS USED TO COLLECT/SELECT THE EVIDENCE**

The evidence reviewed was collected from the Cochrane database of systematic reviews and the Database of Abstracts of Reviews of Effectiveness (DARE). In addition, the Cochrane Library and medical journals were searched specifically for original publications.

### **NUMBER OF SOURCE DOCUMENTS**

Not stated

## **METHODS USED TO ASSESS THE QUALITY AND STRENGTH OF THE EVIDENCE**

Weighting According to a Rating Scheme (Scheme Given)

## **RATING SCHEME FOR THE STRENGTH OF THE EVIDENCE**

### **Levels of Evidence**

- A. Strong research-based evidence. Multiple relevant, high-quality scientific studies with homogenic results.
- B. Moderate research-based evidence. At least one relevant, high-quality study, or multiple adequate studies.
- C. Limited research-based evidence. At least one adequate scientific study.
- D. No research-based evidence. Expert panel evaluation of other information.

## **METHODS USED TO ANALYZE THE EVIDENCE**

Review of Published Meta-Analyses  
Systematic Review

## **DESCRIPTION OF THE METHODS USED TO ANALYZE THE EVIDENCE**

Not stated

## **METHODS USED TO FORMULATE THE RECOMMENDATIONS**

Not stated

## **RATING SCHEME FOR THE STRENGTH OF THE RECOMMENDATIONS**

Not applicable

## **COST ANALYSIS**

A formal cost analysis was not performed and published cost analyses were not reviewed.

## **METHOD OF GUIDELINE VALIDATION**

Peer Review

## **DESCRIPTION OF METHOD OF GUIDELINE VALIDATION**

Not stated

## RECOMMENDATIONS

### MAJOR RECOMMENDATIONS

**Note:** This guideline has been updated. The National Guideline Clearinghouse (NGC) is working to update this summary. The recommendations that follow are based on the previous version of the guideline.

The levels of evidence [A-D] supporting the recommendations are defined at the end of the "Major Recommendations" field.

#### Aims

- Exclude urinary tract infection and blood contamination (menstruation, sexual trauma, etc.)
- Further investigations should be carried out in all patients with confirmed haematuria that is not explained by the above causes (Carson, Segura, & Greene, 1979; Ritchie, Bevan, & Collier, 1986; Rockall et al., 1997; Benbassat et al., 1996) (Buntinx & Wauters, 1997; DARE-970347, 1999) [C].

#### Macroscopic Haematuria

- Less than 0.5 ml of blood in 500 ml of urine causes macroscopic haematuria. Depending on the urine pH the colour of urine may vary from bright red to almost black. Usually the patient is correct when he/she has noticed the urine to be "bloody."
- Red coloured urine may also be caused by
  - Certain foods (beetroot)
  - Medication (nitrofurantoin, rifampicin)
  - Acute porphyria

#### Microscopic Haematuria

- More than three erythrocytes/high power field in sediment analysis
- More than five erythrocytes/0.9 mm<sup>3</sup> in counting chamber

#### Investigations of Patients with Haematuria

- It should be noted that there is not necessarily a correlation between the degree of haematuria and the severity of the underlying disease. Thus, scant haematuria should be investigated as thoroughly as more significant haematuria.
- If a dipstick test is positive for blood, the finding must be confirmed with a fresh urine sample after a couple of days. The urine must also be examined microscopically. Confirmed haematuria is always an indication for further investigations (Cohen & Brown, 2003).

1. Exclude urinary tract infection and contamination
2. All patients
  - Thorough clinical investigation
  - Urinalysis: proteinuria, erythrocyte morphology, casts, leucocytes

- If the erythrocyte morphology (acanthocytes or red-cell casts) in microscopic haematuria is suggestive of glomerular aetiology, and the patient has no proteinuria or renal impairment (creatinine normal), no further investigations are needed. However, the patient should be monitored with occasional checks (first follow-up at 6 months and annually thereafter) for the possible development of proteinuria or renal impairment (Cohen & Brown, 2003).
  - Blood tests (see below)
  - Ultrasound examination of the kidneys and urinary tract
    - All patients if glomerular haematuria has not been verified with urinalysis or blood tests
  - Cytology (daytime sample) for patients over 40 years of age.
3. Cystoscopy
- In patients over 50 years of age (Cohen & Brown, 2003); in younger patients only if haematuria has been macroscopic or the patient has risk factors for bladder cancer (smoking, occupational exposure, history of cyclophosphamide treatment)
  - Suspicious cells in cytology
  - Increased serum prostate specific antigen (PSA)
  - Ultrasound examination suggestive of bladder pathology
4. Other investigations for selected patients
- Computed tomography (investigation of choice for suspected urinary calculi or tumour of the upper urinary tract)
  - Urography
  - Angiography
  - Pyelography
  - Renal biopsy

### **Medical History**

- In what circumstances was haematuria noted (fever, physical activity, etc.)?
- Are there any other symptoms or signs (increased urinary frequency, dysuria, lower abdominal or flank pain)?
- Is haematuria seen at the initiation of, throughout, or at the end of voiding? Blood at the initiation suggests a urethral pathology, continuous haematuria a renal or ureteral problem, and blood at the end a bladder pathology.
- Are there any hereditary diseases or a tendency for urinary calculus formation?
- Travel abroad (exclude infectious diseases, such as schistosomiasis, malaria, etc.)
- Medication: use of nonsteroidal anti-inflammatory drugs (NSAIDs) or treatment with cytotoxic agents (cyclophosphamide)? These drugs may cause interstitial nephritis (NSAIDs), interstitial cystitis, or uroepithelial cancer (cytotoxic agents).

### **Clinical Investigation**

- Look for petechiae, bruising or enlarged lymph nodes.
- Check blood pressure.
- Abdominal palpation (the size and contour of the liver, spleen, kidneys)

- Palpation of the prostate via the rectum
- Laboratory tests should include coagulation analysis, tests for prostatic disease, immunoglobulin A (IgA) nephropathy, and tests for systemic disease and renal function (blood counts, erythrocyte sedimentation rate [ESR], C-reactive protein [CRP], creatinine, prostate specific antigen, possibly immunoglobulin A).

## **Urinalysis**

- Dipstick tests for blood are sensitive and reliable. False-positive results may be seen in
  - Haemoglobinuria
  - Myoglobinuria
- Reducing agents such as ascorbic acid or gentisic acid (a metabolite of acetyl salicylic acid) reduce and even inhibit the staining reaction.
- A positive dipstick test must be confirmed by analysing the urine sediment (Bonnardeaux, Somerville, & Kaye, 1994).
  - A semiquantitative sediment analysis or quantitative counting chamber may be used. The semiquantitative sediment analysis is reliable in validated conditions.
  - The analysis is carried out on a fresh urine sample, voided before ingesting any fluid (an early morning sample). After the urine is centrifuged the sediment is analysed under a microscope using a 400x magnification.
  - The analysis offers much more information if the sediment is stained or analysed under a phase-contrast microscope. These methods enable observation on the shape of the erythrocytes, which in turn helps to localise the source of bleeding. Symmetric, round and normal appearing red blood cells (RBCs) are seen as a consequence of bleeding in the lower urinary tract, whereas dysmorphic red blood cells (acanthocytes) are seen in association with parenchymal renal disease ("glomerular bleeding") (Fairley & Birch, 1982; Schramek et al., 1989; Marcussen et al., 1992; van der Snoek et al., 1994).
- Culturing midstream urine and analysing urine sediment may not only confirm haematuria, but reveal an infection or the presence of leucocytes, casts, or abnormal cells. Abnormal cells are suggestive of a urinary tract malignancy. However, urinary cytology must always be included in the investigations.
- Sterile pyuria is typical not only of genitourinary tuberculosis, but is also seen in association with calculi and tumours. Concurrent proteinuria is usually suggestive of a renal parenchymal disease.
- Cellular, granular, fatty, or waxy casts in the sediment analysis are suggestive of a renal parenchymal disease.

## **Subsequent Investigations**

- Ultrasound of the kidneys and, if necessary, urography
- Cytology of the urine
- Cystoscopy
- The importance of these investigations depends partly on the age of the patient. In children urography must be done only after careful consideration and cystoscopy is seldom necessary.

- Ultrasound investigation of the kidneys is safe and, particularly in pregnancy, the only recommended investigation. Sometimes additional investigations are needed, such as urography with tomography studies, computed tomography, angiography, and antegrade or retrograde pyelography.
- Urinary cytology: a random daytime sample is better than an early morning sample, but bladder wash cytology is the best. Generally three separate samples should be analysed for the highest diagnostic yield. Up to 80–90% of transitional cell bladder carcinomas may be diagnosed with urinary cytology (Lewis et al., 1976; Samacki et al., 1971; Veltman et al., 1991; Morrison et al., 1984; Badalament et al., 1987).
- If the patient also has pyuria the urine should be cultured for tuberculosis.
- Cystoscopy is performed at the outpatient clinic under local anaesthesia.

### **Additional Investigations and Follow-up**

- Possible additional investigations depend on the primary findings. The more investigations carried out the more likely it is that the underlying cause will be found. Urological investigations will reveal a cause in up to 80% of the cases (Carson, Segura, & Greene, 1979; Ritchie, Bevan, & Collier, 1986; Rockall et al., 1997).
- A renal biopsy will reveal a renal parenchymal disease. Renal biopsy should be considered particularly if the patient has simultaneous proteinuria, pathological casts, or dysmorphic erythrocytes suggestive of a glomerular haematuria. With this approach the patient may be saved from unnecessary antibiotic therapies, repeated radiographic investigations, or cystoscopies.
- Some causes of haematuria are listed in Table 1, below, according to severity (serious causes indicate findings that necessitate major medical intervention or threaten the life of the patient).
- Haematuria in a young patient is usually caused by urinary tract infection, calculi, or parenchymal renal disease, particularly immunoglobulin A nephropathy, whereas malignancy must be considered in patients over the age of 40 years (Ritchie, Bevan, & Collier, 1986). Therefore, haematuria must always be taken seriously.
- The cause of haematuria is not always revealed despite meticulous investigations. It may be necessary to follow up these patients, for example once a year, with a check-up of blood pressure and routine blood tests and urinalyses.

### **Table 1: Causes of Haematuria According to Severity**

#### **Serious**

- Renal carcinoma
- Uroepithelial cancer
- Ureteral stones
- Prostate cancer
- Hydronephrosis
- Tuberculosis
- Polycystic kidney disease
- Parenchymal renal disease

#### **Moderate**

- Kidney stones
- Urinary tract infection
- Interstitial cystitis
- Bladder stones

### **Minor**

- Asymptomatic prostatic hyperplasia

### **Definitions:**

### **Levels of Evidence**

- A. Strong research-based evidence. Multiple relevant, high-quality scientific studies with homogenic results.
- B. Moderate research-based evidence. At least one relevant, high-quality study, or multiple adequate studies.
- C. Limited research-based evidence. At least one adequate scientific study.
- D. No research-based evidence. Expert panel evaluation of other information.

### **CLINICAL ALGORITHM(S)**

None provided

## **EVIDENCE SUPPORTING THE RECOMMENDATIONS**

### **REFERENCES SUPPORTING THE RECOMMENDATIONS**

[References open in a new window](#)

### **TYPE OF EVIDENCE SUPPORTING THE RECOMMENDATIONS**

Concise summaries of scientific evidence attached to the individual guidelines are the unique feature of the Evidence-Based Medicine Guidelines. The evidence summaries allow the clinician to judge how well-founded the treatment recommendations are. The type of supporting evidence is identified and graded for select recommendations (see the "Major Recommendations" field).

## **BENEFITS/HARMS OF IMPLEMENTING THE GUIDELINE RECOMMENDATIONS**

### **POTENTIAL BENEFITS**

- Appropriate investigation and follow-up of patients with hematuria
- Accurate diagnosis of the cause of haematuria

### **POTENTIAL HARMS**

Although dipstick urinalysis tests for blood are sensitive and reliable, false-positive results may be seen in haemoglobinuria and myoglobinuria.

## IMPLEMENTATION OF THE GUIDELINE

### DESCRIPTION OF IMPLEMENTATION STRATEGY

An implementation strategy was not provided.

## INSTITUTE OF MEDICINE (IOM) NATIONAL HEALTHCARE QUALITY REPORT CATEGORIES

### IOM CARE NEED

Getting Better

### IOM DOMAIN

Effectiveness

## IDENTIFYING INFORMATION AND AVAILABILITY

### BIBLIOGRAPHIC SOURCE(S)

Finnish Medical Society Duodecim. Haematuria. In: EBM Guidelines. Evidence-Based Medicine [Internet]. Helsinki, Finland: Wiley Interscience. John Wiley & Sons; 2004 Aug 26 [Various].

### ADAPTATION

Not applicable: The guideline was not adapted from another source.

### DATE RELEASED

2004 Aug 26

### GUIDELINE DEVELOPER(S)

Finnish Medical Society Duodecim - Professional Association

### SOURCE(S) OF FUNDING

Finnish Medical Society Duodecim

### GUIDELINE COMMITTEE

Editorial Team of EBM Guidelines

### COMPOSITION OF GROUP THAT AUTHORED THE GUIDELINE

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## **FINANCIAL DISCLOSURES/CONFLICTS OF INTEREST**

Not stated

## **GUIDELINE STATUS**

**Note:** This guideline has been updated. The National Guideline Clearinghouse (NGC) is working to update this summary.

## **GUIDELINE AVAILABILITY**

This guideline is included in "EBM Guidelines. Evidence-Based Medicine" available from Duodecim Medical Publications, Ltd, PO Box 713, 00101 Helsinki, Finland; e-mail: [info@ebm-guidelines.com](mailto:info@ebm-guidelines.com); Web site: [www.ebm-guidelines.com](http://www.ebm-guidelines.com).

## **AVAILABILITY OF COMPANION DOCUMENTS**

None available

## **PATIENT RESOURCES**

None available

## **NGC STATUS**

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Date Modified: 9/15/2008

